WHAT IS CLAIMED IS:

1. A semiconductor integrated device, provided with a semiconductor chip on which a semiconductor integrated circuit is formed and a support substrate laminated on at least one surface of the semiconductor chip, wherein resin that is a mixture of microparticles is filled between the semiconductor chip and the support substrate, and a distance between the semiconductor chip and the support substrate is larger than the maximum particle diameter of the microparticles.

2. The semiconductor integrated device of claim 1, wherein the distance between the semiconductor chip and the support substrate is larger than the maximum particle diameter of the microparticles at least at an effective element region within the semiconductor chip where the semiconductor integrated circuit is formed.

3. The semiconductor integrated device of claim 1, wherein the resin contains at least two resin layers.

4. The semiconductor integrated device of claim 3, wherein the resin contains a resin layer containing microparticles and a resin layer not containing microparticles.

5. A method of manufacturing a semiconductor integrated device, comprising:

a first step of coating resin mixed with microparticles on

at least one surface of a semiconductor substrate on which a semiconductor integrated circuit is formed, and laminating a support substrate on the semiconductor substrate to hold the resin between the two substrates; and

a second step of pushing the support substrate against the semiconductor substrate, wherein

in the second step, the support substrate is pushed against the semiconductor substrate while keeping a distance between the semiconductor substrate and the support substrate larger than the maximum particle diameter of the microparticles.

6. The method of manufacturing a semiconductor device of claim 5, further comprising a step of hardening the resin by subjecting it to a heat treatment process after the second step, and wherein in the second step the distance between the semiconductor substrate and the support substrate is kept larger than the sum of a contraction amount by which the film thickness of the resin contracts during the hardening step and the maximum particle diameter of the microparticles.

7. The method of manufacturing a semiconductor device of claim 5, further comprising, before the first step, a step of etching the semiconductor substrate to reduce the thickness of the semiconductor substrate.

8. A method of manufacturing a semiconductor integrated device, comprising:

a first step of coating a first resin layer mixed with

microparticles on at least one surface of a semiconductor substrate on which a semiconductor integrated circuit is formed;

a second step of hardening the first resin layer coated in the first step; and

a third step of coating a second resin layer not containing microparticles on the first resin layer hardened in the second step, wherein

in the second step, hardening is carried out so that the film thickness of the first resin layer after hardening is kept larger than the maximum particle diameter of the microparticles.

9. The method of manufacturing a semiconductor device of claim 8, further comprising, before the first step, a step of etching a rear surface of the semiconductor substrate to make the semiconductor substrate thin.